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Retrospective Observational Study on Covid-19 Patients Who Received Antivir-H and IMB Herbal Supplement in Kenya

Athuman Nyae Chiguzo[1*], Amos Lewa Mwavita[1]
[1]Centre for Vector Diseases Research - Kenya Medical Research Institute (KEMRI), P.O Box 54840-00200, Nairobi, Kenya
Corresponding Author: *Athuman Nyae Chiguzo, Kenya Medical Research Institute (KEMRI), P.O Box 54840-00200, Nairobi, Kenya: Mobile phone: +254722756962· Email Address: athuman.chiguzo@gmail.com

Abstract— *The coronavirus disease (COVID -19) is a new zoonotic coronary system RNA virus that is highly infectious and has resulted in many deaths globally. Traditional medicines have been in use over decades in many parts of the world for management of different health disorders. The main objective of the study was to carry out a retrospective observational study on COVID-19 patients who received herbal treatment of Antivir H and Immune Booster (IMB). A total of 97 COVID-19 recovered from the disease over this period after using Antivir-H and IMB herbal supplements administered for the treatment of the virus The study participant's selection criteria were retrospective observational study during the COVID-19 pandemic in Kenya in the year 2022.In conclusion, the abnormal variations of recorded High blood pressure, High respiratory rate, High pulse rate, High body temerature, Low Phosphate, Increasesed LFT and AST, Increased U/E and BUN, High blood Sugar, High level of C-reactive Protein (CRP) in the blood stream and High level of Urine Biochemistry were were restored to their normal medical status within the seven day period of observation.*

Keyword— *COVID-19, Antiviral H, Immune Booster (IMB, Herbal Treatment, Traditional Medicines, Observational Study.*

I. Introduction

The coronavirus disease COVID-19 is a new zoonotic coronary system RNA virus after MERS - CoV, and SARS-CoV that is highly infectious and has resulted in many deaths, causing anxiety in governing bodies globally. What kills patients infected with COVID-19 is Cytokine storm (1), of Acquired Respiratory Disease Syndrome (ARDS), a common immune-pathological event for SAS-CoV-1, SARS-CoV and MERS- CoV infections (2) The infectivity patterns progresses to the lungs, liver, spleen and kidneys. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death. Most initiative trials in Africa focus on herbal Medicine resources (3). Traditional medicines have been in use over decades in many parts of the world for management of different health disorders.

II. Methods

The design was a direct cohort study review of patients that suffered from confirmed COVID-19 and received standard treatment with borderline herbal supplements of Antivir H and IMB at the recommended dosage of 500mg of each 8hourly for seven days. In these cases, quantitative data collection and analysis methods were used. A total of 100 retrospectives observational study during the COVID-19 pandemic in Kenya in the year 2022. The study participants' selection criteria were recruited into retrospective observational study during the COVID-19 pandemic in Kenya in the year 2022.

The study participants' selection criteria were: -
Cluster 1: Patients with critical COVID-19 case under High Dependence Units (HDU) or Intensive Care Units (ICU) hospital care.
Cluster 2: Patients with confirmed COVID-19 with severe pneumonia, under hospital care.
Cluster 3: Patients with confirmed COVID-19 with mild pneumonia, under hospital care.
Cluster 4.: Patients with uncomplicated confirmed COVID-19, under home-based care.
Symptoms in COVID-19 Patients

- High Blood Pressure (mmHg)
- High Respiratory Rate
- High Pulse Rate
- High body Temperature (°C)
- Low Phosphate (PSO2)
- Increased Liver Function Test (LFT) and Aspartate aminotransferase (AST)
- Increased Urine Electrolytes (U/E) and Blood Urea Nitrogen (BUN)
- High Blood Sugar (RBS)
- High level of C-reactive Protein (CRP) in the blood stream
- High level of Urine Biochemistry

Out of 100 observed cases, 34 males and 66 females aged between 14-65 years old. Three (3) (2 males and 1 female) of the study participants died after first dose and sent to isolation with denied access to
The study drug (herbal concoctions) was administered to the patients at the start of the study (i.e., 0 days) and the measurements of the blood pressure, respiratory rates, pulse, temperature, phosphate (PSO_2), LFTs/ AST, U/E and BUN, RBS, C-reactive Protein (CRP), Urine Biochemistry, referrals, deaths, recoveries, and abscondments recorded at 0, 3, 5, and 7 days after admissions. The readings were analyzed and tabulated as shown in the tables below.

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III. Results

Below are the study results per parameter. Summary key parameter findings vis-à-vis the recommended medical level are in Table 1: Summary Parameter Level for Each Cluster Verses the Recommended Medical Level

Blood Pressure (mmHg)

The ideal blood pressure is between 90/ 60 mmHg and 120/ 80 mmHg. High blood pressure is 140/ 90 mmHg or higher while low blood pressure is below 90/ 60 mmHg. The study drug (herbal concoctions) was administered managed to restore the patients' blood pressure (i.e., systolic, and diastolic) to expected medical normal ranges across all the clusters within the study.

The findings revealed that the drug reduced the patients systolic and diastolic from over 200 mmHg and between 125-140 mmHg to between 160-180 mmHg and 110-125 mmHg respectively in three days. The drug again reduced the patients systolic and diastolic from between 160-180 mmHg and 110-125 mmHg to between 160-170 mmHg and 90-100 mmHg respectively in five days. The drug further reduced the patients systolic and diastolic from between 160-170 mmHg and 90-100 mmHg to between 130-132 mmHg and 70-92 mmHg respectively in seven days, which is medically considered remarkable improvement towards normalization.

This is replicated in clusters 2, 3 and 4, where the drug reduced the patients systolic and diastolic from between 160-175 mmHg and between 110-120 mmHg at enrollment to between 110-120 mmHg and 70-80 mmHg respectively within seven days in cluster 2 which is medically considered remarkable improvement towards normalization.

The drug reduced the patients systolic and diastolic from between 145-160 mmHg and between 90-100 mmHg at enrollment to between 110-120 mmHg and 60-65 mmHg respectively within seven days in cluster 3, which is medically considered remarkable improvement towards recovery.

The drug further reduced the patients systolic and diastolic from between 135-140 mmHg and between 85-90 mmHg at enrollment to between 110-120 mmHg and 60-70 mmHg respectively within seven days in cluster 4, which is medically considered normal BP level.

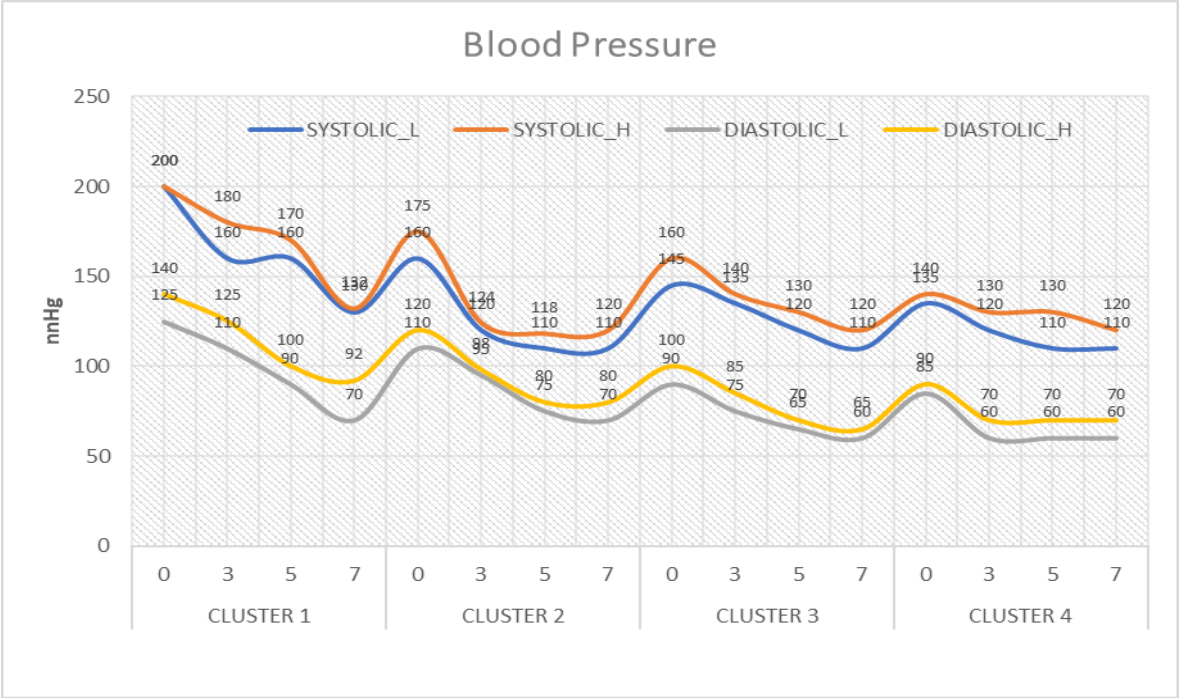

Fig. 1: Blood Pressure (mmHg) Values

Respiratory Rate

The respiration rates may increase with fever, illness, and other medical conditions. The normal respiration rates for an adult person at rest ranges from 12 to 16 breaths per minute. The study participants' respiratory rates were taken at day 0, day 3, day 5 and day 7 of the study. Some of study participants in cluster 1 of the study cohort registered more than 25 breaths per minute in day 0 of the study. All the participants were put under herbal medication (local concoctions) and the measurements recorded at day 3, 5 and 7 of the study. The drug reduced the patients' respiratory rates to between 20-23 breaths per minute as at day 3. The readings recorded at day 5 of the study showed that the drug administered reduced the patients' respiratory rates from between 20-23 breaths per minute to between 16-18 breaths per minute. The readings taken on day 7 revealed that the drug further reduced the patients' respiratory rates from between 16-18 breaths per minute to the expected medical normal range of between 14-15 breaths per minute.

The trend was similar in cluster 2 cohort. The drug reduced the patients' respiratory rates from the maximum rates of between 22-24 breaths per minute in day 0 to the expected

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normal medical range of between 14-16 breaths per minute in day 7 of the study.

In cluster 3 cohort, the administered drug reduced the patients' respiratory rates from between 19-21 breaths per minute in day 0 to the expected medical normal range of between 13-15 breaths per minute in day 7 of the study.

In cluster 4 cohort where the cases were considered mild, the experimental drug administered again reduced the patients' respiratory rates from between 16-18 breaths per minute to the expected medical normal range of between 14-16 breaths per minute.

The experimental herbal medication (local concoctions) was effective across all the clusters (i.e., 1,2, 3, and 4) within the same period of study (seven days) irrespective of the severity of the cases investigated.

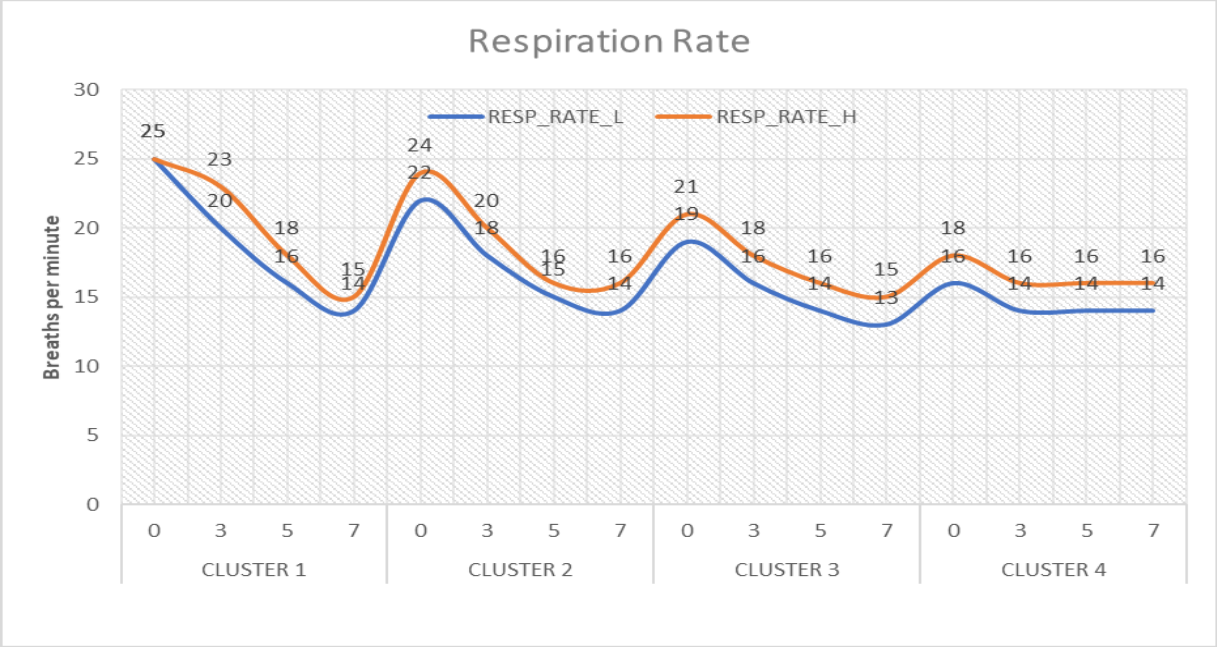

Fig. 2: Respiratory Rate Values

Pulse Rate

The normal pulse for healthy adults' ranges from 60 to 100 beats per minute. the pulse rate may fluctuate and increase with exercise, illness, injury, and emotions. Females ages 12 years and above in general tend to have faster heart rates than their male counterparts. The COVID-19 patients enrolled into the study with some of them registering elevated pulse rates across all the clusters. The study drug (local herbal concoctions) was administered to all the patients in all the cohorts to find out if the drug will help in lowering the elevated pulse rates. The pulse measurements were recorded at day 0, 3, 5, and 7 across all the clusters during this observation period.

The findings showed that the study drug (local herbal concoctions) lowered the pulse rate of the patients in cohort 1 from more than 120 beats per minute in day 0 to 102 beats per minute in day 3. The reading on day 5 of the study showed that the study drug lowered the patients' pulse rates significantly to between the normal medical range of 95-98 beats per minute from 102 beats per minute in day 3. The patients' pulse rates had significantly reduced from between 95-98 beats per minute in day 5 to between the normal medical range of 90-92 beats per minute in day 7.

The trend was similar in cluster 2 cohort where the patients' pulse rates significantly reduced from between 110-120 beats per minute in day 0 to between the near normal medical range of 85-95 beats per minute in day 3. The readings on day 5 showed that the patients' pulse rates significantly reduced from 85-95 beats per minute in day 3 to the normal medical range of 65-70 beats per minute. The patients' pulse rates significantly reduced from 65-70 beats per minute in day 5 to the normal medical range of 60-65 beats per minute in day 7.

The trend was the same in cluster 3 cohort. The patients' pulse rates significantly reduced from between 100-110 beats per minute in day 0 to between 95-100 beats per minute in day 3 to between 85-90 beats per minute in day 5 the finally to the normal medical range of between 75-80 beats per minute in day 7.

Cluster 4 cohort followed the same trend. The patients' pulse rates significantly reduced from the abnormal medical range of 18 beats per minute in day 0 to between 16-18 beats per minute in day 3 to between 15-17 beats per minute in day 5 the finally to the normal medical range of between 14-16 beats per minute in day 7.

Temperature (°C)

The normal body temperature range is 36.5 °C to 37.5 °C. It is useful in identifying possible fever, hyperthermia or hypothemia. The study findings established that some of the COVID-19 patients' temperatures were more than 42 °C at the

time of enrollment into the study. The patients' temperatures reduced significantly from 42 °C in day 0 to the normal medical temperatures of between 36-38 °C in day 3, 5, and 7 in cluster 1 cohort upon administration of the local herbal concoctions for the treatment of COVID-19.

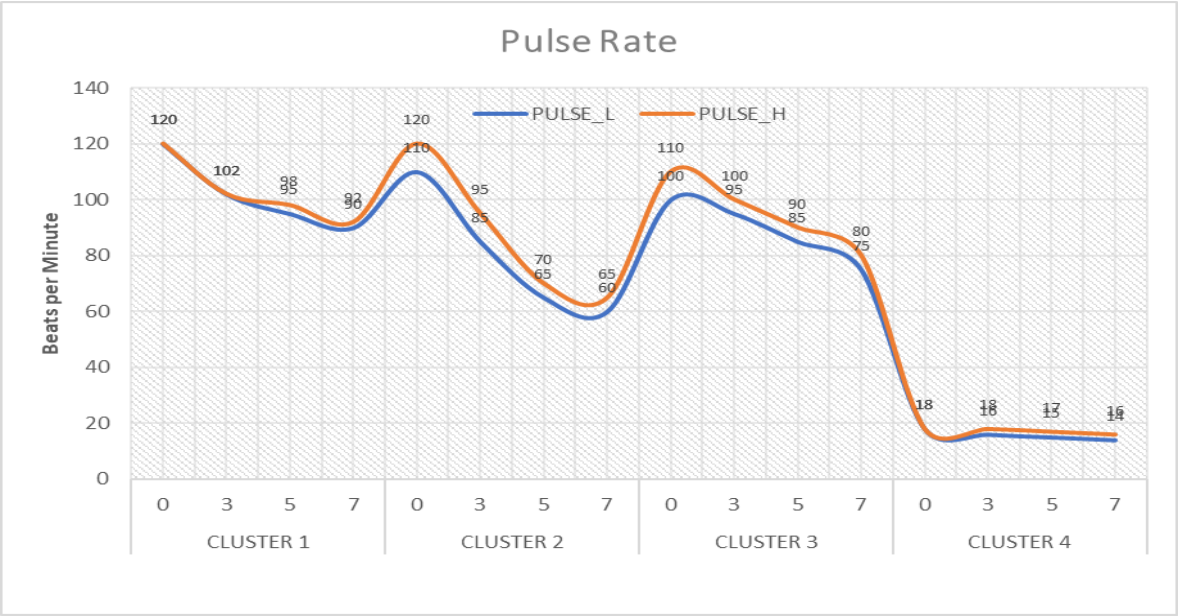

Fig. 3: Pulse Rate Values

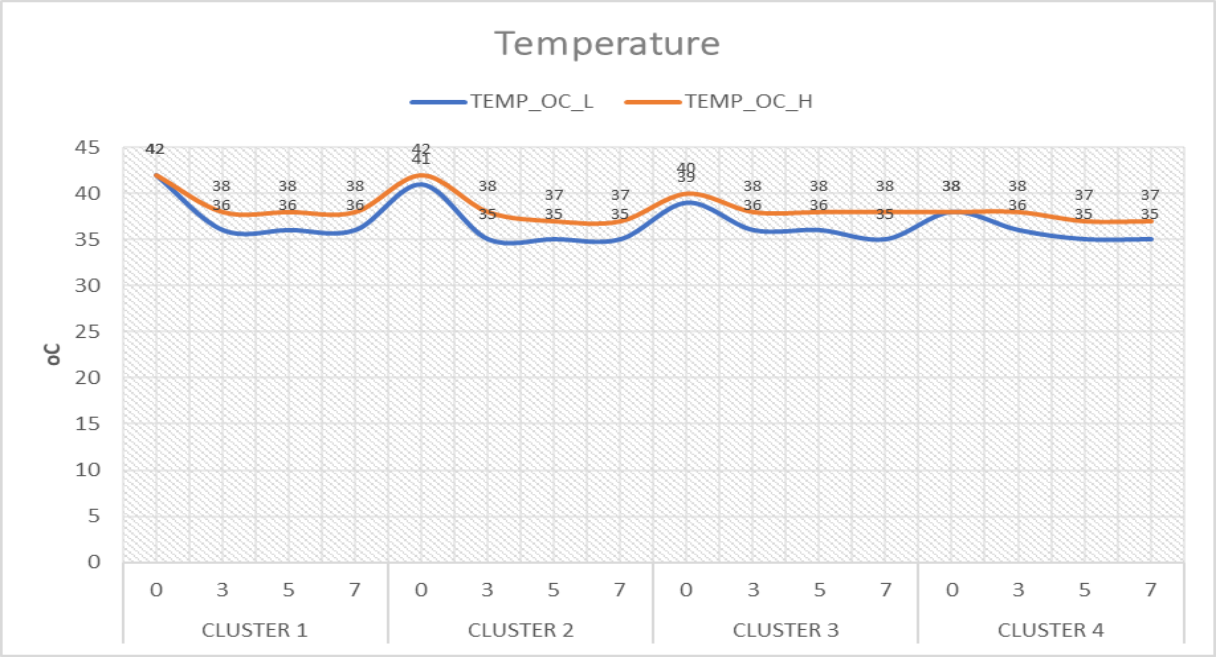

Fig. 4: Temperature (°C) Values

The effects of the experimental drug was the same for the COVID-19 patients in cluster 2 cohort. The patients' temperatures reduced significantly from between 41-42 °C in day 0 to between 35-38 °C in day 3, 35-37 °C in day 5, and 7 respectively upon administration of the local herbal concoctions for the treatment of COVID-19.

The patients' temperatures reduced significantly from 39-40 °C in day 0 to the normal medical temperatures of between 36-38 °C in day 3, and day 5 respectively and to between 35-38 °C in day 7 in cluster 3 cohort upon administration of the local herbal concoctions for the treatment of COVID-19.

In cluster 4 cohort, the study findings established that the administered local herbal concoctions lowered the patients' temperatures significantly from 38 °C in day 0 to between 36-38 °C in day 3, to between 35-37 °C in day 5 and 7 respectively.

The study local herbal concoctions had some impacts on body temperatures among the COVID-19 patients within seven days.

Phosphate (PSO_2)

Phosphate tests are very useful for measuring phosphate level in people with malnutrition. It can be used to check condition calledketoacidosis that affects people with diabetes. The normal serum phosphorus concentration is 3.4 to 4.5 mg/dl (1.12 to 1.45 mmol/L). This flactuates with age. (it's higher in childen than adults), dietry intake and acid-based status.

The study established that some of the COVID-19 patients' enrolled into the study cluster 1 cohort had less than 60 mg/ dl in day 0 of the study. The local herbal concoctions administered to the patients in this cluster 1 significantly increased the patients' phosphate levels to between 75-85 mg/ dl in day 3 to 90-95 mg/ dl in day 5 and finally to the expected normal level of between 98-100 mg/dl in day 7 of the study.

The same case was observed in cluster 2 cohort. The medication significantly increased the level of the COVID-19 patients from 65-80 mg/ dl in day 0 to 90-98 mg/ dl in day 3 to 98-100 mg/ dl in day 5 and finally to 100 mg/ dl in day 7.

The impact was similar for those patients in cluster 3 cohort. The local herbal medication significantly increased the COVID-19 patients' phosphate levels from between 80-95 mg/ dl in day 0 to the normal medical level of between 97-100 mg/ dl in day 3 to the normal medical level of between 98-100 mg/ dl in day 5 and finally to the normal medical level of 100 mg/ dl in day 7.

The cluster 4 cohort that was considered mild cases of COVID-19, also showed some positive impacts of the study drug. The medication significantly increased the low phosphate from between 96-100 mg/ dl in day 0 to between 98-100 mg/ dl in day 3 to 100 mg/ dl in day 5 and day 7 repectively.

The local herbal concoctions had significant effects in the boosting of phosphate level in the patients infected by the COVID-19 more so those who are severely affected by the virus.

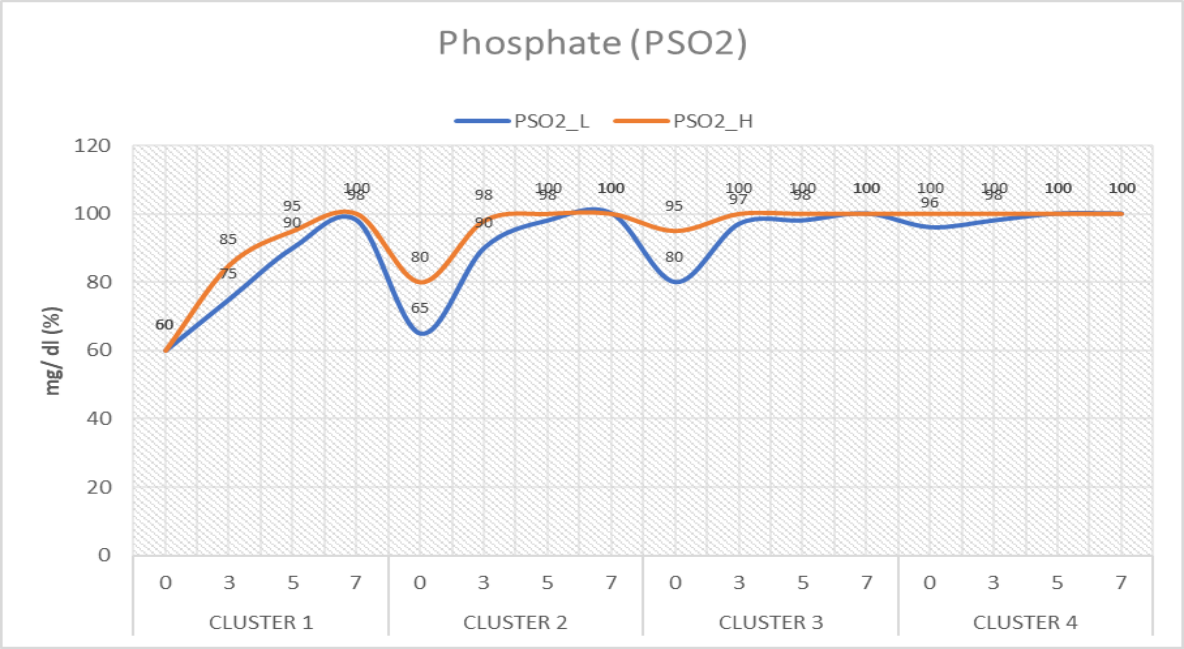

Fig. 5: Phosphate (PSO_2) Values

Liver Function Test (LFT) and Aspartate Amino Transferase (AST)

The standard range blood test results for typical liver fuction tests includes, ALT, 7-55 units per litre (U/L). AST, 8-48 U/L. It looks at how well the liver is functioning and can indicatewhether there is any damage or inflamation inside the liver.

The analysis revealed that the LFT and AST of the COVID-19 patients in cluster 1 cohort ranged between 50-65 U/L and 55-70 U/L respectively at day 0. The LFT and AST significantly reduced to 45-48 U/L and 50-55 U/L respectively in day 3. The tests, LFT and AST further reduced to between 42-46 U/L and 47-50 U/L respectively at day 5. As at day 7, the LFT and AST readings were medically normal between 38-40 U/L and 44-46 U/L respectively.

The LFT and AST of the COVID-19 patients in cluster 2 cohort ranged between 46-50 U/L and 50-58 U/L respectively at day 0. The LFT and AST of the COVID-19 study patients significantly reduced to between 42-47 U/L and 48-55 U/L respectively at day 3 of the herbal concoctions administration. The readings showed that the LFT and AST for the study participants in this cohort futher reduced to between 40-45 U/L and 44-47 U/L respectively as at day 5 of the study. On day 7 of the observation, the LFT and AST readings were between 38-42 U/L and 40-45 U/L respectively.

The trend was similar for those patients in cluster 3 cohort. The LFT and AST for the COVID-19 patients were between 40-48 U/L and 38-45 U/L respectively in day 0.

The LFT and AST for the patients significantly reduced to between 43-46 U/L and 36-44 U/L respectively in day 3 to between 40-45 U/L and 34-44 U/L respectively in day 5 to between 38-42 U/L and 32-40 U/L respectively in day 7.

In cluster 4 cohort, the LFT and AST for the COVID-19 patients in the study were between 42-48 U/L and 36-45 U/L respectively in day 0. The LFT and AST for the participants in this cluster significantly reduced to between 38-46 U/L and 34-40 U/L respectively in day 3 to between 35-40 U/L and 32-40 U/L respectively in day 5 to between 32-38 U/L and 30-40 U/L respectively in day 7 of the study.

The local herbal concoctions administered to the COVID-19 patients across all the clusters in the study significantly reduced the level of LFT and AST to the medically accepted levels within seven days of the study.

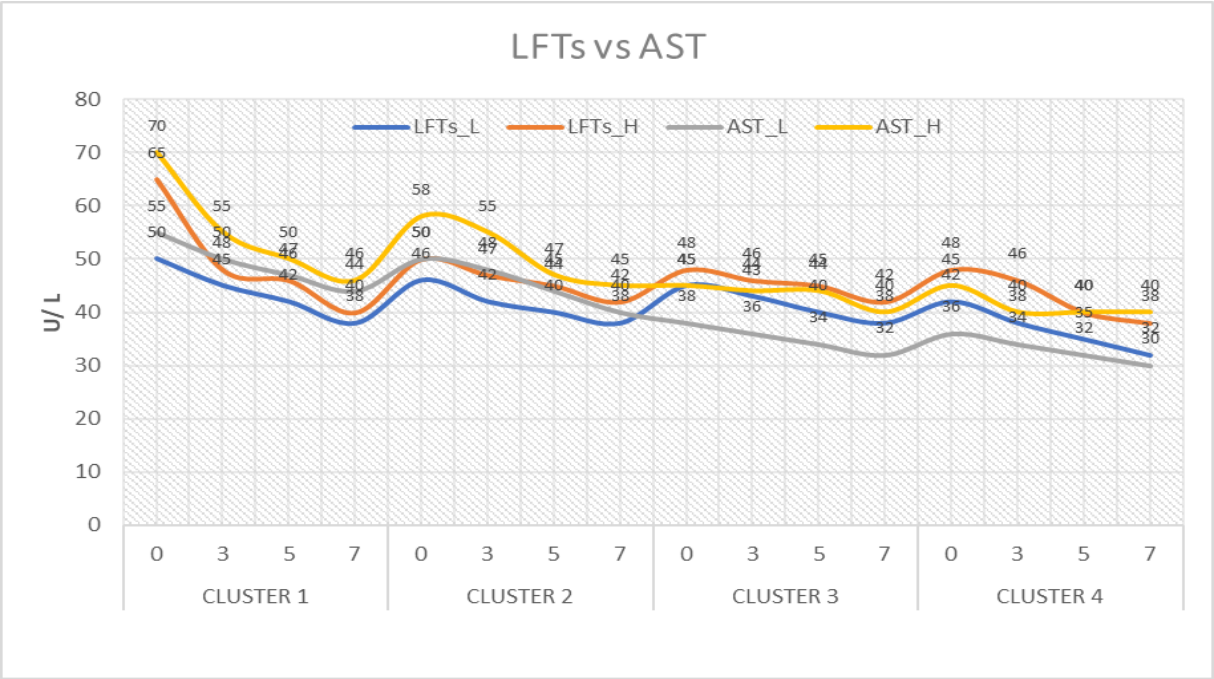

Fig. 6: LFT and AST Values

Urea /Electorolytes (U/E) and Blood Urea Nitrogen (BUN)

Kidney function tests (renal function tests) includes urea and electrolytes tests. It measures levels of various substances in the blood such as sodium, potassium and calcium. The normal range for U/E is 59-104 µmol/L or 45-84 µmol/L. The study sort to find whether the local herbal concoctions will lower the elevated U/E and BUN of the COVID-19 patients enrolled into the study in a period seven days.

The study findings showed that the U/E and BUN for the COVID-19 patients in cluster 1 cohort of the study ranged between 20-24 mg/dL and 1.4-2.2 mg/dL respectively in day 0. The U/E and BUN for the these patients significantly reduced to between 18-22 mg/dL and 1.2-1.6 mg/dL respectively in day 3 to between 16-18 mg/dL and 0.8-1.4 mg/dL respectively in day 5 to between 12-16 mg/dL and 0.8-1.3 mg/dL repspectively in day 7 of the study.

The U/E and BUN for the COVID-19 patients in cluster 2 cohort of the study ranged between 18-22 mg/dL and 1.1-1.6 mg/dL respectively in day 0. The U/E and BUN for the these patients significantly reduced to between 15-18 mg/dL and 0.8-1.2 mg/dL respectively in day 3 to between 13-16 mg/dL and 0.8-1.2 mg/dL respectively in day 5 to between 8-12 mg/dL and 0.8-1.2 mg/dL repspectively in day 7 of the study.

The U/E and BUN for the COVID-19 patients in cluster 3 cohort of the study ranged between 14-20 mg/dL and 0.8-1.2 mg/dL respectively in day 0. The U/E and BUN for the these patients significantly reduced to between 13-15 mg/dL and 0.8-1.2 mg/dL respectively in day 3 to between 8-12 mg/dL and 0.8-1.2 mg/dL respectively in day 5 to between 8-12 mg/dL and 0.8-1.1 mg/dL repspectively in day 7 of the study.

The U/E and BUN for the COVID-19 patients in cluster 4 cohort of the study ranged between 13-16 mg/dL and 0.8-1.2 mg/dL respectively in day 0. The U/E and BUN for the these patients significantly reduced to between 8-12 mg/dL and 0.8-1.2 mg/dL respectively in day 3 to between 8-12 mg/dL and 0.8-1.1 mg/dL respectively in day 5 to between 8-12 mg/dL and 0.8-1.1 mg/dL repspectively in day 7 of the study.

The local herbal concoctions administered to the COVID-19 patients across all the clusters in the study significantly reduced the level of U/E and BUN to the medically accepted levels within seven days of the study.

Blood Sugar (RBS)

This is a blood test to estimate the level of blood sugar of a non-fasting person. It's done to diagnose diabetes mellitus. A blood sugar level less than 140 mg/dL (7.8mmol/L) is normal. The study sort to find whether the local herbal concoctions

will lower the elevated RBS of the COVID-19 patients enrolled into the study in a period seven days.

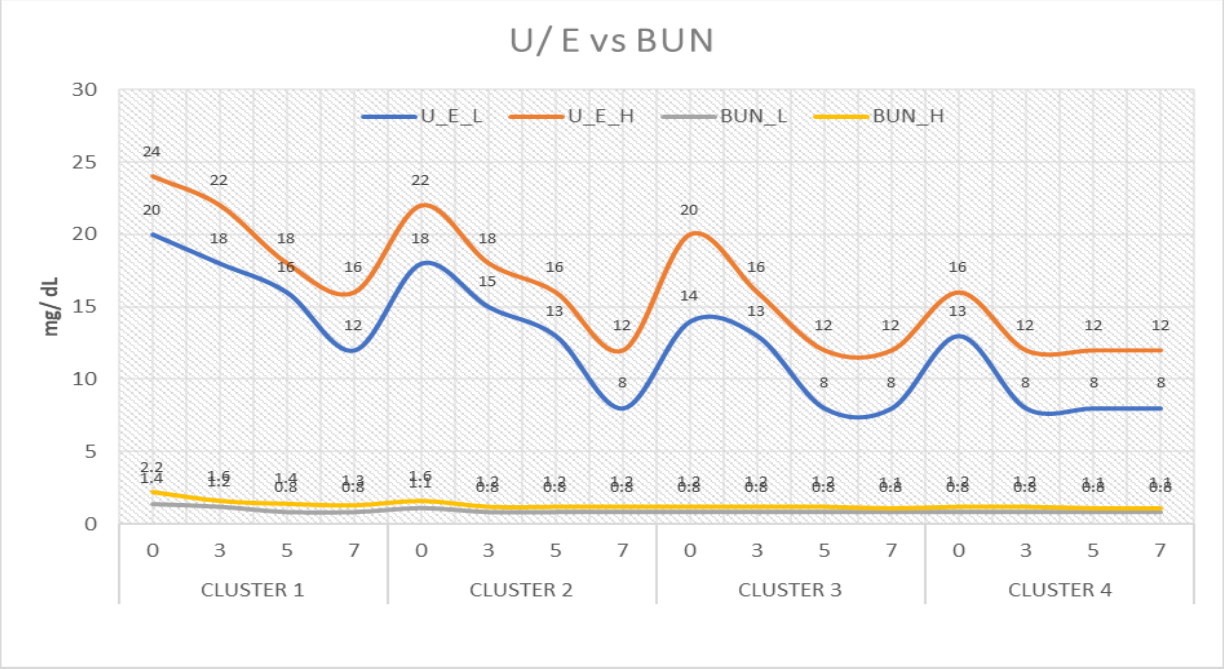

Fig. 7: U/E and BUN Values

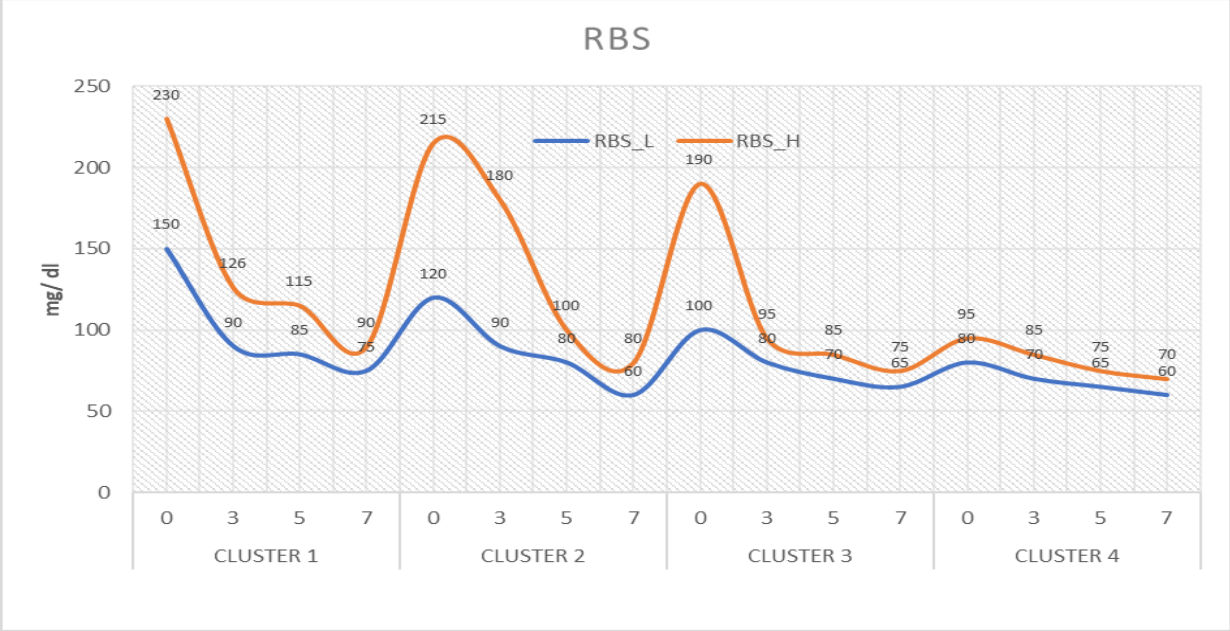

Fig. 8: Blood Sugar (RBS) Values

The study findings showed that the RBS for the COVID-19 patients in cluster 1 cohort of the study ranged between 150-230mg/dl in day 0. The RBS for the these patients significantly reduced to between 90-126 mg/dL in day 3 to between 85-115 mg/dL in day 5 to between 75-90 mg/dL in day 7 of the study.

The RBS for the COVID-19 patients in cluster 2 cohort of the study ranged between 120-215 mg/dL in day 0. The RBS for the these patients significantly reduced to between 90-180 mg/dL in day 3 to between 80-100 mg/dL in day 5 to between 60-80 mg/dL in day 7 of the study.

The RBS for the COVID-19 patients in cluster 3 cohort of the study ranged between 100-190 mg/dL in day 0. The RBS for the these patients significantly reduced to between 80-95 mg/dL in day 3 to between 70-85 mg/dL in day 5 to between 65-75 mg/dL in day 7 of the study.

The RBS for the COVID-19 patients in cluster 4 cohort of the study ranged between 80-95 mg/dL in day 0. The RBS for the these patients significantly reduced to between 70-85

mg/dL in day 3 to between 65-75 mg/dL in day 5 to between 60-70 mg/dL in day 7 of the study.

The local herbal concoctions administered to the COVID-19 patients across all the clusters in the study significantly reduced the level of RBS to the medically accepted levels within seven days of the study.

C-reactive Protein (CRP)

This is protein made in the liver and released into the bloodstream. This test checks for inflamation in the body. Less than 0.3 mg/dL is normal for healthy adults, 0.3-1.0 mg/dL normal for minors.

The study sort to find whether the local herbal concoctions will lower the elevated CRP of the COVID-19 patients enrolled into the study in a period seven days.

The study findings showed that the C-reactive Protein (CRP) for the COVID-19 patients in cluster 1 cohort of the study ranged between 14-18 mg/dl in day 0. The CRP for the these patients significantly reduced to between 8-12 mg/dL in day 3 to between 6-8 mg/dL in day 5 to between 5-7 mg/dL in day 7 of the study.

The CRP for the COVID-19 patients in cluster 2 cohort of the study ranged between 8-12 mg/dL in day 0. The RBS for the these patients significantly reduced to between 8-11 mg/dL in day 3 to between 6-8 mg/dL in day 5 to between 5-7 mg/dL in day 7 of the study.

The CRP for the COVID-19 patients in cluster 3 cohort of the study ranged between 8-12 mg/dL in day 0. The CRP for the these patients significantly reduced to between 7-9 mg/dL in day 3 to between 6-8 mg/dL in day 5 to between 5-7 mg/dL in day 7 of the study.

The CRP for the COVID-19 patients in cluster 4 cohort of the study ranged between 7-9 mg/dL in day 0. The CRP for the these patients significantly reduced to between 6-8 mg/dL in day 3 to between 5-7 mg/dL in day 5 to between 4-6 mg/dL in day 7 of the study.

The local herbal concoctions administered to the COVID-19 patients across all the clusters in the study significantly reduced the level of C-reactive Protein to the medically accepted levels within seven days of the study.

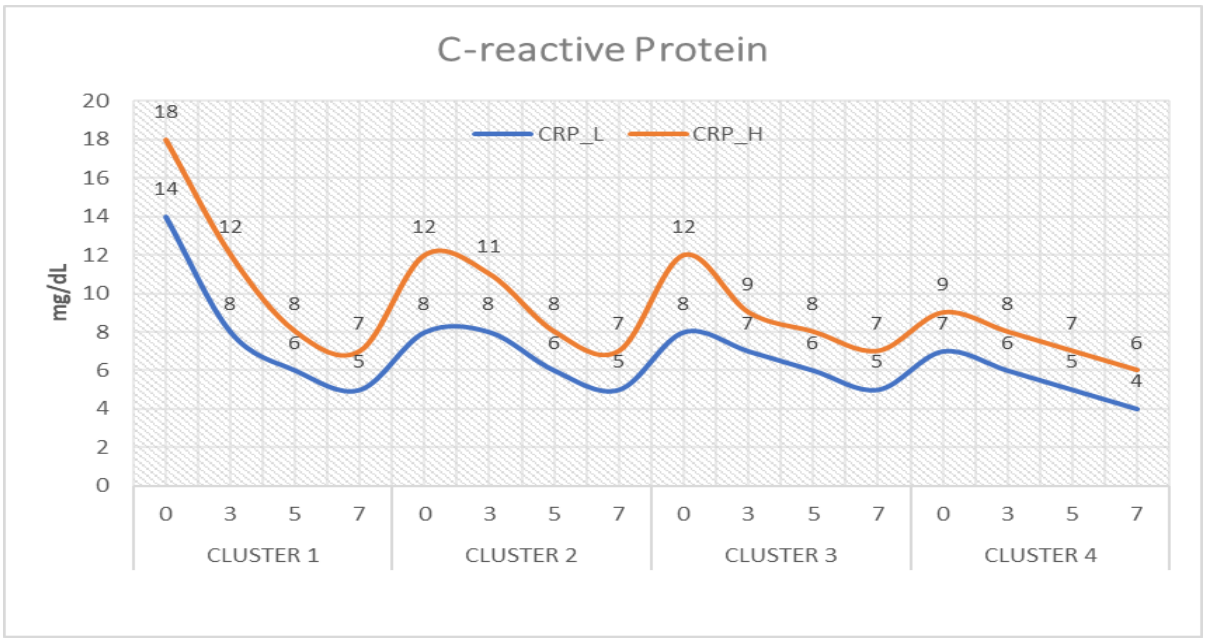

Fig. 9: C-reactive Protein (CRP) Values

Urine Biochemistry

The study sort to find whether the local herbal concoctions will lower the elevated Urine Biochemistry of the COVID-19 patients enrolled into the study in a period seven days.

The study findings showed that the Urine Biochemistry for the COVID-19 patients in cluster 1 cohort of the study ranged between 2.2-3.5 mg/dl in day 0. The Urine Biochemistry for the these patients significantly reduced to between 1.6-2.5 mg/dL in day 3 to between 1.4-1.8 mg/dL in day 5 to between 0.8-1.2 mg/dL in day 7 of the study.

The Urine Biochemistry for the COVID-19 patients in cluster 2 cohort of the study ranged between 2.5-4.5 mg/dL in day 0. The RBS for the these patients significantly reduced to between 2.0-3.8 mg/dL in day 3 to between 1.6-2.2 mg/dL in day 5 to between 1.1-1.3 mg/dL in day 7 of the study.

The Urine Biochemistry for the COVID-19 patients in cluster 3 cohort of the study ranged between 2.0-3.8 mg/dL in day 0. The CRP for the these patients significantly reduced to between 1.8-2.2 mg/dL in day 3 to between 1.6-2.2 mg/dL in day 5 to between 1.4-1.8 mg/dL in day 7 of the study.

The Urine Biochemistry for the COVID-19 patients in cluster 4 cohort of the study ranged between 1.8-2.2 mg/dL in day 0. The CRP for the these patients significantly reduced to between 1.6-1.9 mg/dL in day 3 to between 1.5-1.7 mg/dL in day 5 to between 1.4-1.6 mg/dL in day 7 of the study.

The local herbal concoctions administered to the COVID-19 patients across all the clusters in the study significantly

reduced the level of Urine Biochemistry to the medically accepted levels within seven days of the study.

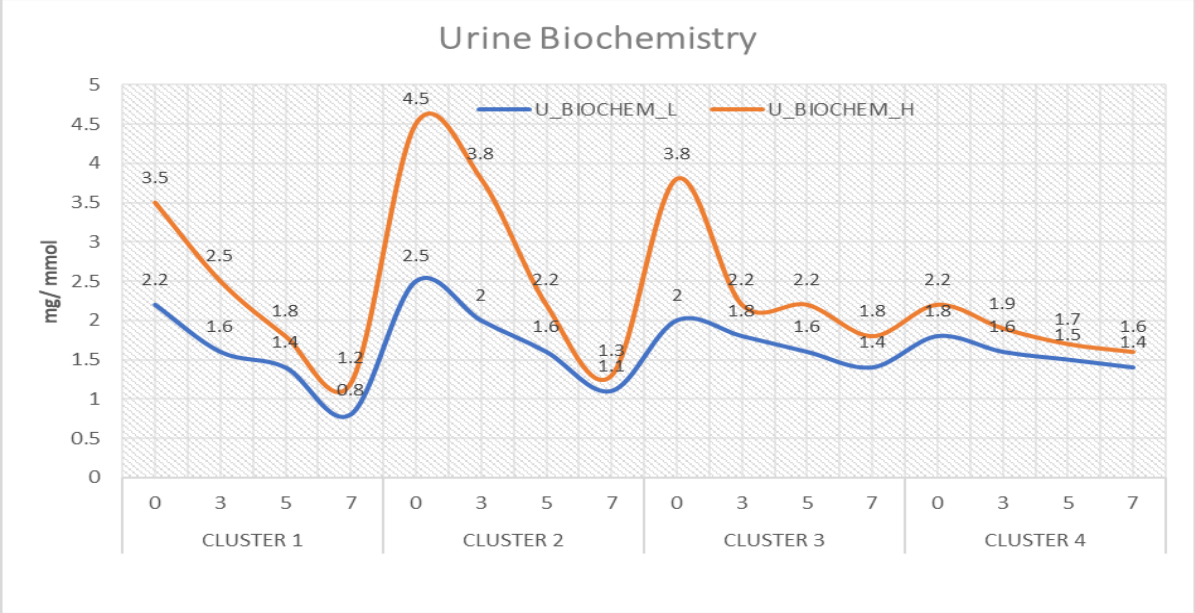

Fig. 10: Urine Biochemistry Values

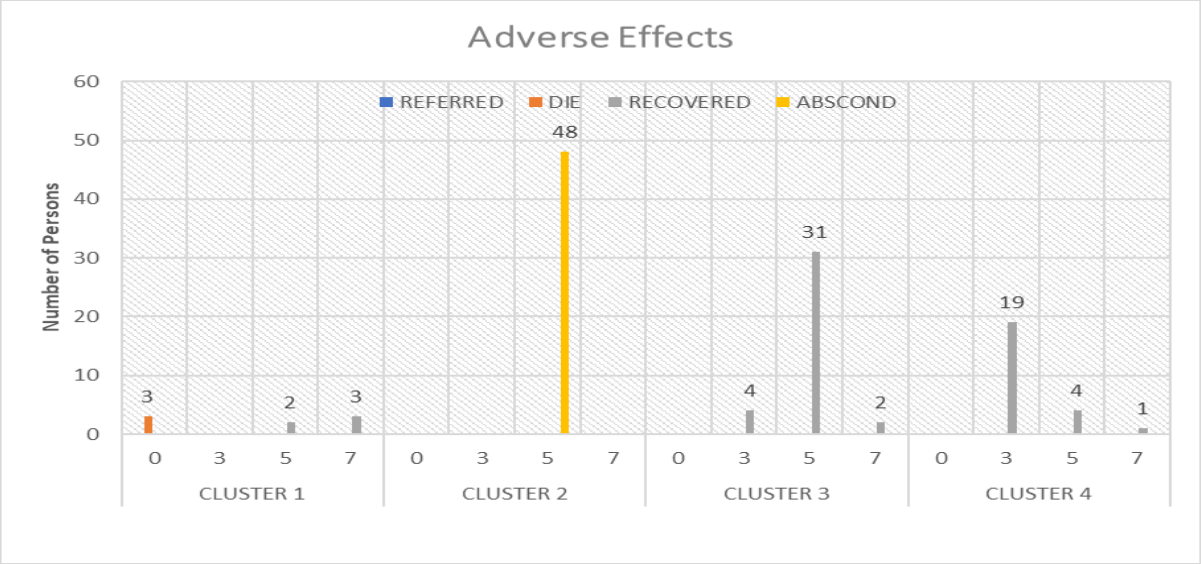

Fig. 11: Adverse Effects Values

Adverse Effects

The study sort to find whether there were casualties recorded from the COVID-19 patients enrolled into the study in a period seven days.

During the study, none of the COVID-19 patients enrolled into the study were referred for further treatment and care across the clusters in the seven days of observation, three deaths were recorded at day 0, two and three recoveries were recorded at day 5 and 7 respectively in cluster 1 cohort. A total of 48 study absconded at day 5 in cluster 2 cohort. A total of 37 recoveries were recorded in cluster 2 (i.e., 4 at day 3, 31 at day 5 and 2 at day 7). 24 recoveries were recorded in cluster 4 cohort (19 at day 3, 4 at day 5 and 1 at day 7).

The analysis revealed that no death was recorded across all the clusters during the period of the trial with local herbal concoctions administered for the treatment of COVID-19.

IV. Discussion

High Blood Presure (mmHg)

The findings revealed that the drug reduced the patients systolic and diastolic from over 200 mmHg and between 125-140 mmHg to between 160-180 mmHg and 110-125 mmHg respectively in three days. The drug again reduced the patients systolic and diastolic from between 160-180 mmHg and 110-125 mmHg to between 160-170 mmHg and 90-100 mmHg respectively in five days. The drug further reduced the patients systolic and diastolic from between 160-170 mmHg and 90-

100 mmHg to between 130-132 mmHg and 70-92 mmHg respectively in seven days, which is medically considered remarkable improvement towards normalization.

This is replicated in clusters 2, 3 and 4, where the drug reduced the patients systolic and diastolic from between 160-175 mmHg and between 110-120 mmHg at enrollment to between 110-120 mmHg and 70-80 mmHg respectively within seven days in cluster 2 which is medically considered remarkable improvement towards normalization.

The drug reduced the patients systolic and diastolic from between 145-160 mmHg and between 90-100 mmHg at enrollment to between 110-120 mmHg and 60-65 mmHg respectively within seven days in cluster 3, which is medically considered remarkable improvement towards recovery.

The drug further reduced the patients systolic and diastolic from between 135-140 mmHg and between 85-90 mmHg at enrollment to between 110-120 mmHg and 60-70 mmHg respectively within seven days in cluster 4, which is medically considered normal BP level (4).

Respiratory Rate

The respiration rates may increase with fever, illness, and other medical conditions. The normal respiration rates for an adult person at rest ranges from 12 to 16 breaths per minute. The study participants' respiratory rates were taken at day 0, day 3, day 5 and day 7 of the study. Some of study participants in cluster 1 of the study cohort registered more than 25 breaths per minute in day 0 of the study. All the participants were put under herbal medication (local concoctions) and the measurements recorded at day 3, 5 and 7 of the study. The drug reduced the patients' respiratory rates to between 20-23 breaths per minute as at day 3. The readings recorded at day 5 of the study showed that the drug administered reduced the patients' respiratory rates from between 20-23 breaths per minute to between 16-18 breaths per minute. The readings taken on day 7 revealed that the drug further reduced the patients' respiratory rates from between 16-18 breaths per minute to the expected medical normal range of between 14-15 breaths per minute.

The trend was similar in cluster 2 cohort. The drug reduced the patients' respiratory rates from the maximum rates of between 22-24 breaths per minute in day 0 to the expected normal medical range of between 14-16 breaths per minute in day 7 of the study.

In cluster 3 cohort, the administered drug reduced the patients' respiratory rates from between 19-21 breaths per minute in day 0 to the expected medical normal range of between 13-15 breaths per minute in day 7 of the study (5).

In cluster 4 cohort where the cases were considered mild, the experimental drug administered again reduced the patients' respiratory rates from between 16-18 breaths per minute to the expected medical normal range of between 14-16 breaths per minute (5).

The experimental herbal medication (local concoctions) was effective across all the clusters (i.e., 1,2, 3, and 4) within the same period of study (seven days) irrespective of the severity of the cases investigated.

Pulse Rate

The average pulse rate for a healthy adult is between 60 and 100 beats per minute. The pulse rate can vary and rise during physical activity, sickness, injury, and emotional outbursts. Females ages 12 years and above in general tend to have faster heart rates than their male counterparts. The COVID-19 patients enrolled into the study with some of them registering elevated pulse rates across all the clusters. The study drug (local herbal concoctions) was administered to all the patients in all the cohorts to find out if the drug will help in lowering the elevated pulse rates. The pulse measurements were recorded at day 0, 3, 5, and 7 across all the clusters during this observation period.

The findings showed that the study drug (local herbal concoctions) lowered the pulse rate of the patients in cohort 1 from more than 120 beats per minute in day 0 to 102 beats per minute in day 3. The reading on day 5 of the study showed that the study drug lowered the patients' pulse rates significantly to between the normal medical range of 95-98 beats per minute (5) from 102 beats per minute in day 3. The patients' pulse rates had significantly reduced from between 95-98 beats per minute in day 5 to between the normal medical range of 90-92 beats per minute in day 7.

The trend was similar in cluster 2 cohort where the patients' pulse rates significantly reduced from between 110-120 beats per minute in day 0 to between the near normal medical range of 85-95 beats per minute in day 3. The readings on day 5 showed that the patients' pulse rates significantly reduced from 85-95 beats per minute in day 3 to the normal medical range of 65-70 beats per minute. The patients' pulse rates significantly reduced from 65-70 beats per minute in day 5 to the normal medical range of 60-65 beats per minute in day 7.

The trend was the same in cluster 3 cohort. The patients' pulse rates significantly reduced from between 100-110 beats per minute in day 0 to between 95-100 beats per minute in day 3 to between 85-90 beats per minute in day 5 the finally to the normal medical range of between 75-80 beats per minute in day 7 (5).

Cluster 4 cohort followed the same trend. The patients' pulse rates significantly reduced from the abnormal medical range of 18 beats per minute in day 0 to between 16-18 beats per minute in day 3 to between 15-17 beats per minute in day 5 the finally to the normal medical range of between 14-16 beats per minute in day 7.

Temperature

The normal body temperature range is 36.5 ^{o}C to 37.5 ^{o}C (6,7,8). It is useful in identifying possible fever, hyperthermia or hypothemia. The study findings established that some of the COVID-19 patients' temperatures were more than 42 ^{o}C at the time of enrollment into the study. The patients' temperatures reduced significantly from 42 ^{o}C in day 0 to the normal medical temperatures of between 36-38 ^{o}C in day 3, 5, and 7 in cluster 1 cohort upon administration of the local herbal concoctions for the treatment of COVID-19.

The effects of the experimental drug was the same for the COVID-19 patients in cluster 2 cohort. The patients' temperatures reduced significantly from between 41-42 ^{o}C in

day 0 to between 35-38 °C in day 3, 35-37 °C in day 5, and 7 respectively upon administration of the local herbal concoctions for the treatment of COVID-19.

The patients' temperatures reduced significantly from 39-40 °C in day 0 to the normal medical temperatures of between 36-38 °C (6, 7, 8) in day 3, and day 5 respectively and to between 35-38 °C in day 7 in cluster 3 cohort upon administration of the local herbal concoctions for the treatment of COVID-19.

In cluster 4 cohort, the study findings established that the administered local herbal concoctions lowered the patients' temperatures significantly from 38 °C in day 0 to between 36-38 °C in day 3, to between 35-37 °C in day 5 and 7 respectively.

The study local herbal concoctions had some impacts on body temperatures among the COVID-19 patients within seven days.

Phosphate (PSO_2)

Phosphate tests are very useful for measuring phosphate level in people with malnutrition. It can be used to check condition called ketoacidosis that affects people with diabetes. The normal serum phosphorus concentration is 3.4 to 4.5 mg/dl (1.12 to 1.45 mmol/L) (9, 10). This flactuates with age. (it's higher in childen than adults), dietry intake and acid-based status.

The study established that some of the COVID-19 patients' enrolled into the study cluster 1 cohort had less than 60 mg/ dl in day 0 of the study. The local herbal concoctions administered to the patients in this cluster 1 significantly increased the patients' phosphate levels to between 75-85 mg/ dl in day 3 to 90-95 mg/ dl in day 5 and finally to the expected normal level of between 98-100 mg/dl (9,10) in day 7 of the study.

The same case was observed in cluster 2 cohort. The medication significantly increased the level of the COVID-19 patients from 65-80 mg/ dl in day 0 to 90-98 mg/ dl in day 3 to 98-100 mg/ dl in day 5 and finally to 100 mg/ dl in day 7.

The impact was similar for those patients in cluster 3 cohort. The local herbal medication significantly increased the COVID-19 patients' phosphate levels from between 80-95 mg/ dl in day 0 to the normal medical level of between 97-100 mg/ dl in day 3 to the normal medical level of between 98-100 mg/ dl in day 5 and finally to the normal medical level of 100 mg/ dl in day 7.

The cluster 4 cohort that was considered mild cases of COVID-19, also showed some positive impacts of the study drug. The medication significantly increased the low phosphate from between 96-100 mg/ dl in day 0 to between 98-100 mg/ dl in day 3 to 100 mg/ dl in day 5 and day 7 repectively.

The local herbal concoctions had significant effects in the boosting of phosphate level in the patients infected by the COVID-19 more so those who are severely affected by the virus.

Liver Function Tests (LFT) and AST

The standard range blood test results for typical liver fuction tests includes, ALT, 7-55 units per litre (U/L). AST, 8-48 U/L (11, 12. It looks at how well the liver is functioning and can indicate whether there is any damage or inflamation inside the liver.

The analysis revealed that the LFT and AST of the COVID-19 patients in cluster 1 cohort ranged between 50-65 U/L and 55-70 U/L respectively at day 0. The LFT and AST significantly reduced to 45-48 U/L and 50-55 U/L respectively in day 3. The tests, LFT and AST further reduced to between 42-46 U/L and 47-50 U/L respectively at day 5. As at day 7, the LFT and AST readings were medically normal between 38-40 U/L and 44-46 U/L (11, 12) respectively.

The LFT and AST of the COVID-19 patients in cluster 2 cohort ranged between 46-50 U/L and 50-58 U/L respectively at day 0. The LFT and AST of the COVID-19 study patients significantly reduced to between 42-47 U/L and 48-55 U/L respectively at day 3 of the herbal concoctions administration. The readings showed that the LFT and AST for the study participants in this cohort futher reduced to between 40-45 U/L and 44-47 U/L respectively as at day 5 of the study. On day 7 of the observation, the LFT and AST readings were between 38-42 U/L and 40-45 U/L respectively.

The trend was similar for those patients in cluster 3 cohort. The LFT and AST for the COVID-19 patients were between 40-48 U/L and 38-45 U/L respectively in day 0.

The LFT and AST for the patients significantly reduced to between 43-46 U/L and 36-44 U/L respectively in day 3 to between 40-45 U/L and 34-44 U/L respectively in day 5 to between 38-42 U/L and 32-40 U/L respectively in day 7.

In cluster 4 cohort, the LFT and AST for the COVID-19 patients in the study were between 42-48 U/L and 36-45 U/L respectively in day 0. The LFT and AST for the participants in this cluster significantly reduced to between 38-46 U/L and 34-40 U/L respectively in day 3 to between 35-40 U/L and 32-40 U/L respectively in day 5 to between 32-38 U/L and 30-40 U/L respectively in day 7 of the study.

The local herbal concoctions administered to the COVID-19 patients across all the clusters in the study significantly reduced the level of LFT and AST to the medically accepted levels within seven days of the study.

Blood Sugar (RBS)

This is a blood test to estimate the level of blood sugar of a non-fasting person. It's done to diagnose diabetes mellitus. A blood sugar level less than 140 mg/dL (7.8mmol/L) is normal (13). The study sort to find whether the local herbal concoctions will lower the elevated RBS of the COVID-19 patients enrolled into the study in a period of seven days.

The study findings showed that the RBS for the COVID-19 patients in cluster 1 cohort of the study ranged between 150-230mg/dl in day 0. The RBS for the these patients significantly reduced to between 90-126 mg/dL in day 3 to between 85-115 mg/dL in day 5 to between 75-90 mg/dL in day 7 of the study.

The RBS for the COVID-19 patients in cluster 2 cohort of the study ranged between 120-215 mg/dL in day 0. The RBS for the these patients significantly reduced to between 90-180 mg/dL in day 3 to between 80-100 mg/dL in day 5 to between 60-80 mg/dL in day 7 of the study.

The RBS for the COVID-19 patients in cluster 3 cohort of the study ranged between 100-190 mg/dL in day 0. The RBS for the these patients significantly reduced to between 80-95 mg/dL in day 3 to between 70-85 mg/dL in day 5 to between 65-75 mg/dL in day 7 of the study.

The RBS for the COVID-19 patients in cluster 4 cohort of the study ranged between 80-95 mg/dL in day 0. The RBS for the these patients significantly reduced to between 70-85 mg/dL in day 3 to between 65-75 mg/dL in day 5 to between 60-70 mg/dL in day 7 of the study.

The local herbal concoctions administered to the COVID-19 patients across all the clusters in the study significantly reduced the level of RBS to the medically accepted levels within seven days of the study.

C-reactive Protein (CRP)

This is protein made in the liver and released into the bloodstream. This test checks for inflamation in the body. Less than 0.3 mg/dL is normal for healthy adults, 0.3-1.0 mg/dL normal for minors (14, 15). The study sort to find whether the local herbal concoctions will lower the elevated CRP of the COVID-19 patients enrolled into the study in a period seven days.

The study findings showed that the CRP for the COVID-19 patients in cluster 1 cohort of the study ranged between 14-18 mg/dl in day 0. The CRP for the these patients significantly reduced to between 8-12 mg/dL in day 3 to between 6-8 mg/dL in day 5 to between 5-7 mg/dL in day 7 of the study.

The CRP for the COVID-19 patients in cluster 2 cohort of the study ranged between 8-12 mg/dL in day 0. The RBS for the these patients significantly reduced to between 8-11 mg/dL in day 3 to between 6-8 mg/dL in day 5 to between 5-7 mg/dL in day 7 of the study.

The CRP for the COVID-19 patients in cluster 3 cohort of the study ranged between 8-12 mg/dL in day 0. The CRP for the these patients significantly reduced to between 7-9 mg/dL in day 3 to between 6-8 mg/dL in day 5 to between 5-7 mg/dL in day 7 of the study.

The CRP for the COVID-19 patients in cluster 4 cohort of the study ranged between 7-9 mg/dL in day 0. The CRP for the these patients significantly reduced to between 6-8 mg/dL in day 3 to between 5-7 mg/dL in day 5 to between 4-6 mg/dL in day 7 of the study.

The local herbal concoctions administered to the COVID-19 patients across all the clusters in the study significantly reduced the level of C-reactive Protein to the medically accepted levels within seven days of the study.

Urine Biochemistry

The study sort to find whether the local herbal concoctions will lower the elevated Urine Biochemistry of the COVID-19 patients enrolled into the study in a period seven days.

The study findings showed that the Urine Biochemistry for the COVID-19 patients in cluster 1 cohort of the study ranged between 2.2-3.5 mg/dl in day 0. The Urine Biochemistry for the these patients significantly reduced to between 1.6-2.5 mg/dL in day 3 to between 1.4-1.8 mg/dL in day 5 to between 0.8-1.2 mg/dL in day 7 of the study.

The Urine Biochemistry for the COVID-19 patients in cluster 2 cohort of the study ranged between 2.5-4.5 mg/dL in day 0. The RBS for the these patients significantly reduced to between 2.0-3.8 mg/dL in day 3 to between 1.6-2.2 mg/dL in day 5 to between 1.1-1.3 mg/dL in day 7 of the study.

The Urine Biochemistry for the COVID-19 patients in cluster 3 cohort of the study ranged between 2.0-3.8 mg/dL in day 0. The CRP for the these patients significantly reduced to between 1.8-2.2 mg/dL in day 3 to between 1.6-2.2 mg/dL in day 5 to between 1.4-1.8 mg/dL in day 7 of the study.

The Urine Biochemistry for the COVID-19 patients in cluster 4 cohort of the study ranged between 1.8-2.2 mg/dL in day 0. The CRP for the these patients significantly reduced to between 1.6-1.9 mg/dL in day 3 to between 1.5-1.7 mg/dL in day 5 to between 1.4-1.6 mg/dL in day 7 of the study.

The local herbal concoctions administered to the COVID-19 patients across all the clusters in the study significantly reduced the level of Urine Biochemistry to the medically accepted levels (16) within seven days of the study.

Adverse Effects

The study sort to find whether there were casualties recorded from the COVID-19 patients enrolled into the study in a period seven days.

During the study, none of the COVID-19 patients enrolled into the study were referred for further treatment and care across the clusters in the seven days of observation, three deaths were recorded at day 0, two and three recoveries were recorded at day 5 and 7 respectively in cluster 1 cohort. A total of 48 study absconded at day 5 in cluster 2 cohort. A total of 37 recoveries were recorded in cluster 2 (i.e., 4 at day 3, 31 at day 5 and 2 at day 7). 24 recoveries were recorded in cluster 4 cohort (19 at day 3, 4 at day 5 and 1 at day 7).

The analysis revealed that no death was recorded across all the clusters during the period of the trial with local herbal concoctions administered for the treatment of COVID-19.

V. Conclusions

The Antivir-H and IMB administered for the treatment of COVID-19 patients across all clusters prevented deaths caused by COVID-19 over the 7 day period of trial and observation. A total of 97 COVID-19 recovered from the disease over this period after using Antivir-H and IMB herbal supplements administered for the treatment of the virus. The abnormal variations recorded in the following were restored to their normal medical status with this 7 day period of observation.

VI. Fundig and Ethical Clearance

The study was funded by the authors, The study ethical approval was carried out by Pwani University in Kilifi County, Kenya.

Acknowledgements And Conflict Of Interest

We thank the management of Pona Herbal Care Limited and Clinic in Mombasa, Kenya for providing the herbal supplements (Antivir H and IMB) that were administered to the patient during the study. There is no conflict of interest in relation to this study from the parties involved.

TABLE 1: Summary Parameter Level for Each Cluster Verses the Recommended Medical Level

Parameter	Levels after day 7				Recommended medical level
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	
Blood Pressure (*mmHg*)	130-132/ 70-92	110-120/ 70-80	110-120/ 60-65	110-120/ 60-70	*90-60/ 120- 80 mmHg*
Respiratory Rate (*Breaths per minute*)	14-15	14-16	13-15	14-16	*12-16 breaths per minute*
Pulse Rate (*Beats per minute*)	90-92	60-65	75-80	14-16	*60-100 beats per minute*
Temperature (^oC)	36-38	35-37	35-38	35-37	*36.5-37.5 ^oC*
Phosphate (PSO2) (*mg/dl %*)	98-100	100	100	100	*3.4-4.5 mg/dl (1.12-1.45 mmol/L)*
LFT and AST *(U/L)*	38-40/ 44-46	38-42/ 40-45	38-42/ 32-40	32-38/ 30-40	*ALT, 7-55 (U/L). AST, 8-48 U/L*
U/E and BUN (*mg/dL*)	12-16/ 0.8-1.3	8-12/ 0.8-1.2	8-12/ 0.8-1.1	8-12/ 0.8-1.1	*59-104 µmol/L or 45-84 µmol/L*
Blood Sugar (RBS) (*mg/dL*)	75-90	60-80	65-75	60-70	*< 140 mg/dL (7.8mmol/L)*
C-reactive Protein (CRP) (*mg/dL*)	5-7	5-7	5-7	4-6	*< Adults = 0.3 mg/dL, Minors = 0.3-1.0 mg/dL*
Urine Biochemistry (*mg/dL*)	0.8-1.2	1.1-1.3	1.4-1.8	1.4-1.6	*Unique to each chemistry*

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